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AN ENTOMOLOGIST IN NEW GUINEA.

BY JACQUES R. HELFER, Mendocino, California.

We landed at Oro Bay, Papuan New Guinea, splashing ashore through the surf from our LCV type landing craft which had run aground a short distance from shore. There was a sandy beach stretching for miles in either direction; overhead the sun beat down fiercely against our steel helmets; ahead was a neglected coconut grove, overgrown with brush, extending as far as the eye could see, up and down the coast. This narrow strand, separating the jungle from the sea was to typify every place we were to land in New Guinea, and often there were swamps beyond the first line of trees, and always there were the myriads of biting flies.

Our first task was to clear a space and render it habitable. Armed with machetes and liberally smeared with insect repellent we went to work. I know of no better way of becoming acquainted with the flora of a new territory than by chopping through a tangled thicket with a machete. One is made painfully aware of the presence of novel spined vines and barbed bushes, and trees growing from tall pyramids of roots, their trunks never reaching the ground. One comes face to face unexpectedly with large beady-eyed spiders, but these are not as bad as the ants. There is a species of very anti-social red ant, 12 mm. in length which I must warn anyone against who plans to collect in New Guinea. It constructs its waterproof clubhouses by webbing together the living leaves of a shrub into hollow chambers the size of cantaloupes. A machete would crash into one of these structures and immediately the hapless woodsman would be covered with the aggressive hard biting ants. I highly recommend the manoeuvre humorously referred to as "stragetic withdrawal" to anyone finding himself the object of a concerted attack by these creatures. There is no standing and fighting them. At night it was necessary to sleep under mosquito bars to protect against malaria and elephantiasis. In walking

through the kunai grass during the day it was necessary to apply insect repellent liberally over the lower extremities to prevent bites from a tiny red mite, vector of the deadly scrub typhus. To remove one's shirt was to invite the bite of the tiny white and black sand-fly, resulting in an ugly red itching welt.

But thus far I have spoken of the Arthropods which one meets the hard way, which, in their singularly direct way "catch the entomologist," so to speak. It is a welcome relief to issue forth from one's tent, armed with alcohol vials, and to go in search of the less well known insects which, when approached, flee from the entomologist instead of attacking him in concert as fair game. It always offended my sense of propriety to feel a biting fly sink his proboscis into my neck just as I was reaching over to pick a beetle off a leaf. They have absolutely no sense of the fitness of things!

Two things become strikingly apparent when one goes collecting in the New Guinea jungles. First, although he roll over stones and logs for hours, the collector will seldom find anything in the muddy wetness beneath. Carabidae are very uncommon, their duties being taken over by very active foliage-running Cicindelidae and swift flying Staphylinidae. And second is the remarkable absence of insects in the flowers which one sees blooming all around. Even the tree orchids, blooming in festoons, high above the jungle floor, attract no insects to speak of. The wild Cockscomb, however, attracted some pretty little Scarabaeidae in March and April, and a sort of Morning Glory, sinking its roots deep into the sand on the seaward edge of the jungle, attracted a little bluish Eucnemid to its pinkish flowers, making the second and last notable exception to the generally sterile hunting grounds provided by the jungle flowers.

Chrysomelidae and Rhyncophorinae have reached a high degree of specialization and are numerous everywhere, from the first fringe of vegetation at the edge of the beach to the high mountains a few miles back, excepting in the swamps.

Many of the Coleoptera are found only on specific food plants and it is easy to get into the habit of ignoring all but a few very productive types of plants in collecting. This is a mistake as repeated careful examination of previously unproductive shrubs over a period of time will often turn up seasonal forms which would otherwise be completely overlooked. Some plants, however, are never very productive, to be sure.

Although the absence of coniferous trees, oaks, willows, and the other familiar groups of trees of our countryside was painfully evi-

dent, I was, nevertheless, struck at once by the similarity of many of the New Guinea plant forms to our own natives. There was, for example, a shrub having leaves very similar in outline and texture to our Thimble Berry. Wherever I encountered this shrub I found *Trachys* (Buprestidae) abundantly, chewing little holes in the leaves, but very few other insects. There was a small shrub which I couldn't have distinguished from our Hazel Nut excepting that it had no nuts. *Trachys* fed upon its leaves occasionally, but very few other insects were attracted to it. Sword Ferns, indistinguishable to me from our own, grew everywhere in shady situations. The diminutive members of the genus *Endelus* (Buprestidae) fed upon the leaves of these ferns, gnawing tiny holes like the work of flea beetles. In the Philippines, on Leyte Island, I also found *Endelus* abundantly on sword-type ferns and nowhere else. Morning Glory grew everywhere in the half sunlight and was fed upon by various Tortoise Beetles and Chrysomelidae, the former always feeding on the under side of the leaf. On Leyte Island, Morning Glory leaves were often chewed to ragged shreds by two species of *Trachys* (each one keeping to its particular kind of Morning Glory). One of the New Guinea shrubs resembles closely the shiny leafed tree-shrub commonly called Greasewood in Northern California, and was the specific host to a species of *Melobasis* (Buprestidae). Giant Magnolias, growing in the outer fringe of jungle, seemed to be the host to the large Cetoninae. Many of the plant forms are strange to dwellers in temperate climates, and one must learn them without the advantage of being able to call them by the name of their equivalents in our flora.

Staphylinidae occurred in rotten Breadfruits under the Breadfruit Trees, in the fermenting sap of Coconut logs and stumps, and in all sorts of refuse, in company with Nitidulidae, a few Histeridae, and Scarabaeidae. Weevils were attracted in good numbers to fermenting sap of various kinds of palms.

On Biak Island, in the Schoutens, where generally the same collecting conditions prevail as elsewhere in the New Guinea region, I found Staphylinidae and *Chrysobothris* (Buprestidae) being attracted in considerable numbers to the drums of fermenting mash at a still located in a coppice of mixed growth with Banyan and Hibiscus very plentiful.

The swamps are inhabited by a few foliage running Cicindelidae and some large *Xantholinini* (Staphylinidae) and little else. *Anopheles* is ambushed there, however, with plenty of her thirsty sisters.

The large Dynastids and Cetonids (Scarabaeidae) are nowhere plentiful. The former fly to lights occasionally, with many smaller Scarabaeidae and other beetles, but usually are noticed walking about over the ground. The Cetonids, big green and red and black and blue bizarrely marked beetles, are very curious, flying down to within two or three feet of the collector's face and then hovering there, dodging every sweep of the hat, until, tiring of the sport at last, they fly off like humming birds through the trees. I regret to say that my composure was invariably severely ruffled by these performances and that the Cetonid's departure was always marked by interludes of vilification. But it is possible to capture a small number of these in the early mornings when they are sometimes seen resting sluggishly on foliage. One day a dump containing 622 Bangalore Torpedos exploded, blasting a great crater. The next day all around the crater I found beetles which, apparently shaken up by the blast, had climbed up onto everything available and were recuperating in the sunshine.

There were many species of beetles inhabiting the fungus growths which were very plentiful on logs and dead trees. One little blue species came out from under the bark where it lived in the early morning just after a rain, and was easily taken in numbers on the Coconut stumps.

Shield Bugs (Hemiptera) were plentiful at times on the foliage of particular trees and on Hibiscus and are very offensive smelling when handled, which contrasts sharply with the beauty of their metallic coloration.

Lampyridae were easily taken at night by watching in moist areas for their flashes.

Cicindela species occurred on sandy flats, on earth sides of gullies, along roads and the banks of streams, very much as they do in America.

Sifting of litter produced a disappointingly few specimens, mostly small Staphylinidae.

The persistent association of Buprestidae with Banyan trees suggests that this tree is the host of many Buprestid species. *Belionota, Chrysobothris,* and *Cyphogastra* in company with *Agrilus* frequented the trunks of felled trees, *Agrilus, Sambus,* and *Melobasis* occurring on the foliage, especially where it was sprouting from stumps. Most *Agrilus,* however, were found actively flying about from leaf to leaf of mixed growths of low brush, especially bordering trails, streams, or along margins of the jungle.

It was a general rule that collecting was better along the edges of

the jungle, although many forms would be missed by a failure to search through the dense portions of the jungle. Buprestidae, especially, were most plentiful in the sunshine or where thin overhead foliage made a pattern of light and shade. Coccinellidae and Cerambycidae were taken in similar situations, the former on foliage, the latter more often on woody parts of trees or shrubs, just as one would expect to find them in America. One species of Cerambycidae was common in the centers of a pineapple-like plant, where it could be taken from its hiding places among the leaf-bases by breaking down the leaves with the feet.

Many species of Lepidoptera were fairly abundant in open jungle and in open areas. The giant *Ornithoptera* are plentiful but have the exasperating habit of flying high overhead among the great trees, far out of reach. Occasionally they are found flying low around Hibiscus clumps and around the purple flowers of the Pleronas and the dainty Rock Roses where they can be taken with the hand from the flowers.

Scorpions were nowhere plentiful and I was never able to find the large red-tailed species which our Army Handbook carefully warned us against, try as I might! A few small species lived under loose bark of trees and among the bases of leaf-branches of palms.

Lucanidae were uncommon, a few specimens turning up on trees or accidentally around camp.

There was always a coastal track just inside the outer fringe of jungle, wherever we went, the highway of the natives, leading ever onward and a convenient route to follow when collecting in strange country to keep from getting lost. The gardens of the natives are often encountered if one follows the little side trails leading back into the jungle, and these are often very productive of species which are not encountered elsewhere.

In conclusion I would like to say that in the jungles of New Guinea, where I collected over a period of sixteen months, at eleven different localities, just as in America, the collector must work hard and with ingenuity if he would take many interesting Coleoptera. They are not to be scraped into the collecting jar by handsfull. The large bizarre species of Coleoptera are not plentiful. As in America, many of the insects are seasonal and many are consistently associated with particular food plants.